

IV. CONDITIONS AND IMPACTS AFFECTING EARTHWORKS:

A. Conditions/Impacts Affecting the Preservation of Structures and Features



Uprooted trees, often caused by strong wind events (i.e. microburst, tornadoes, hurricanes) , displace large sections of soil and destroy the integrity of the historic features. (Wind Damage at Battery XIII, 4/1998)



Any tree is subject to being windthrown but trees greater than 12" dbh (diameter breast height) have a higher risk. (Wind Damage at Battery XIII, 4/1998)



Moderate wind events that occur after the soil is saturated due to rain or snow will also uproot trees. (Ft. Fisher, 3/99)



Mature trees succumb to natural tree mortality. This is a major concern to park management because many of the trees have already reached their maturity and others are fast approaching it. (Fort Stedman, 7/1997)



Trees growing on the tops and sides of earthworks are more susceptible to being windthrown due to weaker root systems. (Fort Stedman, 7/1997)



Where earthworks are left in forest cover, visitors gravitate to the top of the earthworks for a better view and create trails running along the crest of the works. This compacts the soil, increases runoff and leads to more erosion. When trees are removed and tall grass is planted, visitors can see the features. The tall grass restricts their access to the top and trails do not develop. (Fort Conahey, 2/2000)



Uprooted trees also damage earthworks by crushing parapets upon impact. (Wind Damage at Battery XIII, 4/1998)



Depression caused by uprooted tree in previous photo. (Battery XIII, 4/1998)



Steep slopes prevent leaf or forest litter from providing an adequate cover to prevent erosion (Battery XI, 7/1997)



Limited ground vegetation, partially due to insufficient sunlight, does not provide adequate erosion protection. (Battery XI, 8/1997)



Native clump grasses have provided limited coverage against erosion (Battery IV, 11/1998)



Sparse vegetation encourages the growth of undesirable plants (i.e. saplings, exotics). (Battery IV, 11/1998)



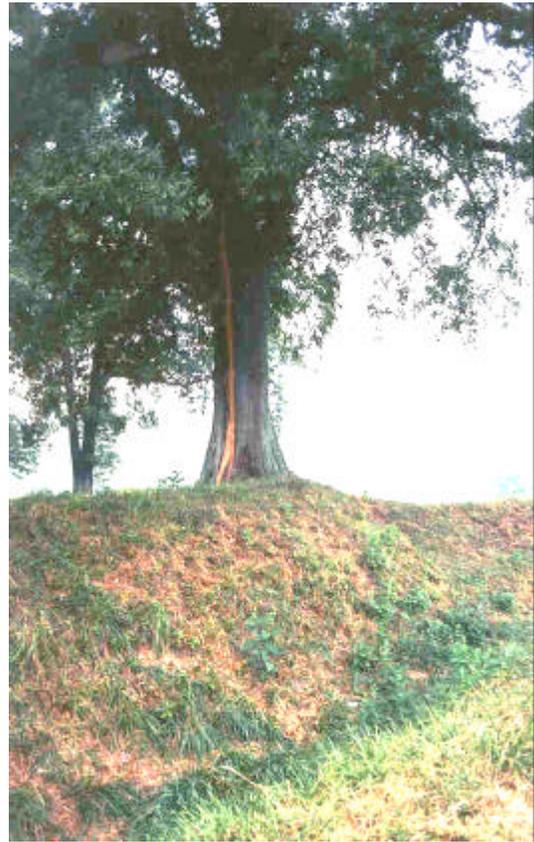
Many times, trees do not exhibit exterior signs of disease or heart rot. (Fort Stedman, 9/1997)



Many mature trees have, or are susceptible to, "heart rot". (Fort Stedman, 9/1997)



Decay and insect infestation also leads to tree mortality. (Fort Stedman, 9/1997)



Trees located atop forts and batteries are more susceptible to lightning strikes because of their prominent location upon the landscape. (Fort Stedman, 8/1997)



Large limbs frequently fall and impale the earthworks at depths up to four (4) feet. (Fort Stedman, 4/1996)



Groundhogs often burrow into earthworks and create additional erosion impacts. (Battery XI, 7/1997)

B. Conditions/Impacts Affecting the Interpretive Values



Uprooted trees displace archaeological resources. (Battery XIII, 4/1998)



Uprooted trees can also damage historic artillery pieces. (Battery XIII, 4/1998)

C. Conditions/Impacts Affecting Sustainability

- Maintaining earthworks under a heavy forest canopy and dense understory does not satisfy the Park's management objective for interpretation, safety, or visitor accessibility.
- Earthworks under a forest canopy with little or no understory will be subject to erosion, not only from natural forces, but also from visitors scaling the earthworks.
- Grass planted under a forest canopy does not receive sufficient sunlight to provide a thorough grass cover for protection from erosion.
- Any large trees on the earthworks are subject to windthrow.
- Earthworks with no trees and a tall grass cover that provides protection from erosion is the preferred treatment that will achieve all of management's objectives listed in Section III.
- Designing trails and waysides to "steer" and inform the visitors is critical. (See Appendix G)
- An important component of sustainability is the ability to implement and maintain the selected treatment with available funds and staff.
- Prescribed burning is not an option due to the close proximity to private and public housing, and major roads. Additionally, prescribed burning requires that certain weather conditions must be within prescription. Park management believes the risk of maintaining earthworks by fire exceeds safety parameters in the Eastern and Western Front units of the park.
- Mowing is a cost effective and time efficient practice to maintain a healthy stand of grass and keep undesirable woody-stem plants from invading the earthworks. Mowing with specialized equipment on a semi-annual basis is a versatile method that is cheaper and safer than prescribed burning. Mowing is a less labor-intensive operation with a wider window of when the work can be accomplished. Burning, on the other hand, requires more personnel and is limited to windows dictated by weather conditions. Proper mowing practices has provided protection from erosion and defined the earthen landscape to give the visitors a good interpretive experience. The Park has demonstrated that this management practice works and is sustainable.

D. Conditions/Impacts Affecting Visitor Accessibility

Vegetation, such as brush and trees, impede not only the view of the earthworks but also accessibility to the fort. Thick understory also provides concealment for relic hunters.

BEFORE



Fort Wadsworth, 5/1994

AFTER



Fort Wadsworth, 3/1995

E. Conditions/Impacts Affecting a Safe Environment



Falling limbs can cause serious injury to visitors. (Fort Stedman, 8/1997)



Trees die and stumps rot creating hidden hazards for visitors. (Fort Stedman 3/98)

F. Conditions/Impacts Affecting Non-historic Resources

Impacts to the non-historic resources may include:

- Threatened and Endangered Species (T&E)

An inventory of the possible presence of T&E species should be conducted prior to vegetation removal.

- Wetlands

Generally speaking, forts, batteries and salients were constructed on the high ground, which would eliminate or reduce any occurrence of wetlands. If wetlands are found, mitigation of the wetlands still could be utilized based on the importance of the cultural resource.

- Trees

Tree removal can effect wildlife habitat. Dead, hollow trees pose a safety hazard to visitors justifying their removal for safety.

G. Additional Issues Affecting Earthwork Management



The cost of removing windthrown trees, associated root systems and repairing the damage is substantially more expensive than felling trees and removing them prior to storm events. (Battery XIII, 5/1998)



Through the media, the public is educated about the problems associated with trees growing on earthworks and the urgency for their preservation. (Battery XIII, 4/1998)